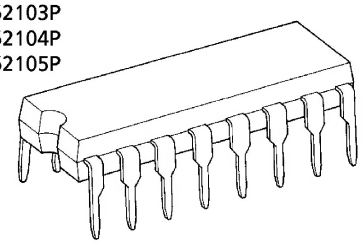
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62101P, TD62101F, TD62103P, TD62103F TD62104P, TD62104F, TD62105P, TD62105F

7CH DARLINGTON SINK DRIVER

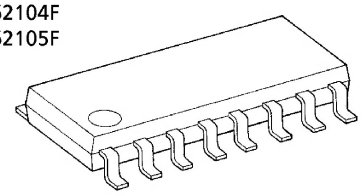
The TD62101P / F series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

TD62101P
TD62103P
TD62104P
TD62105P



DIP16-P-300-2.54A

TD62101F
TD62103F
TD62104F
TD62105F



SOP16-P-225-1.27

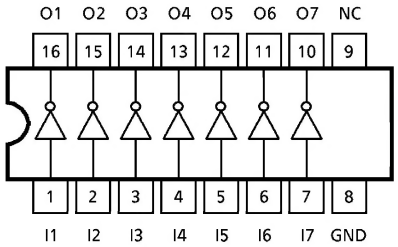
Weight
DIP16-P-300-2.54A : 1.11g (Typ.)
SOP16-P-225-1.27 : 0.16g (Typ.)

FEATURES

- Output current (single output) : 500mA (Max.)
- High sustaining voltage output : 25V (Min.)
- Inputs compatible with various types of logic.
- Package type-P : DIP-16 pin.
- Package type-F : SOP-16 pin.

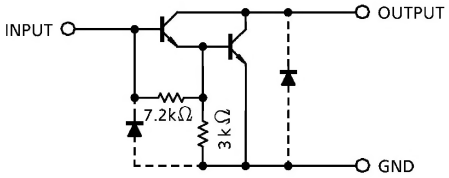
TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62101P / F	External	General Purpose
TD62103P / F	2.7kΩ	TTL, 5V CMOS
TD62104P / F	10.5kΩ	6~15V CMOS, PMOS
TD62105P / F	20kΩ	12~25V CMOS, PMOS

PIN CONNECTION (TOP VIEW)



SCHEMATICS (EACH DRIVER)

TD62101P / F

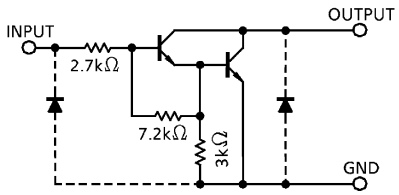


(Note) The input and output parasitic diodes cannot be used as clamp diodes.

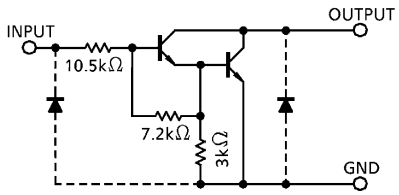
961001EBA2

SCHEMATICS (EACH DRIVER)

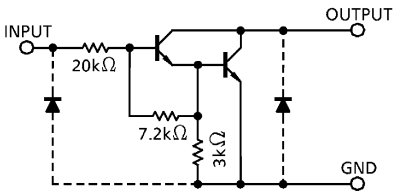
TD62103P / F



TD62104P / F



TD62105P / F



(Note)The input and output parasitic diodes cannot be used as clamp diodes.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage		$V_{CE\ (SUS)}$	− 0.5 ~ 25	V
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN} (Note 1)	− 0.5 ~ 30	V
Input Current		I_{IN} (Note 2)	25	mA
Power Dissipation	P	P_D	1.0	W
	F		0.625 (Note 3)	
Operating Temperature	P	T_{opr}	− 30 ~ 75	°C
	F		− 40 ~ 85	
Storage Temperature		T_{stg}	− 55 ~ 150	°C

(Note 1) Except TD62101P / F
(Note 2) Only TD62101P / F
(Note 3) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS (Ta = − 40 ~ 85°C and Ta = − 30 ~ 75°C for only Type-P)

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage		$V_{CE\ (SUS)}$		0	—	25	V
Output Current		I_{OUT}	DC 1 Circuit	0	—	350	mA / ch
			T_{pw} = 25ms, Duty = 10% 7 Circuits, Ta = 85°C, T_j = 120°C	0	—	300	
Input Voltage	Except TD62101P / F	V_{IN}		0	—	20	V
Input Current	Only TD62101P / F	I_{IN}		—	—	10	mA
Power Dissipation	P	P_D		—	—	0.44	W
	F		(Note)	—	—	0.325	

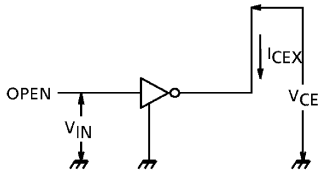
(Note) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

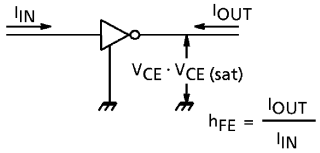
CHARACTERISTIC			SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Leakage Current		P	I_{CEX}	1	V_{CE} = 25V, I_{IN} = 0	Ta = 75°C	—	—	100	μA
		F				Ta = 85°C	—	—	100	
Collector-Emitter Saturation Voltage			$V_{CE\ (sat)}$	2	I_{OUT} = 350mA, I_{IN} = 600μA		—	1.3	2.2	V
					I_{OUT} = 200mA, I_{IN} = 400μA		—	1.1	2.0	
					I_{OUT} = 100mA, I_{IN} = 200μA		—	1.0	1.8	
DC Current Transfer Ratio			h_{FE}	2	V_{CE} = 2V, I_{OUT} = 350mA		1000	—	—	
Input Current	Output On	TD62101P / F	$I_{IN\ (ON)}$	3	V_{IN} = 1.5V, I_{OUT} = 350mA		—	0.25	—	mA
					V_{IN} = 1.75V, I_{OUT} = 350mA		—	1.00	—	
		TD62103P / F			V_{IN} = 2.4V, I_{OUT} = 350mA		—	0.4	0.7	
		TD62104P / F			V_{IN} = 13.5V, I_{OUT} = 350mA		—	1.2	1.7	
		TD62105P / F			V_{IN} = 20.0V, I_{OUT} = 350mA		—	1.0	1.5	
	Output Off	P	$I_{IN\ (OFF)}$	4	I_{OUT} = 500μA	Ta = 75°C	50	65	—	μA
		F				Ta = 85°C	50	65	—	
Input Voltage	Output On	TD62103P / F	$V_{IN\ (ON)}$	5	V_{CE} = 2V	I_{OUT} = 125mA	—	—	2.1	V
		TD62104P / F					—	—	4	
		TD62105P / F					—	—	6.4	
		TD62103P / F				I_{OUT} = 250mA	—	—	2.7	
		TD62104P / F					—	—	7	
		TD62105P / F					—	—	12	
		TD62103P / F				I_{OUT} = 350mA	—	—	3.3	
		TD62104P / F					—	—	8.8	
		TD62105P / F					—	—	15	
Input Capacitance			C_{IN}	6	V_{IN} = 0, f = 1MHz		—	15	—	pF
Turn-On Delay			t_{ON}	7	V_{OUT} = 25V, R_L = 70Ω, C_L = 15pF		—	0.1	—	μs
Turn-Off Delay			t_{OFF}				—	0.2	—	

TEST CIRCUIT

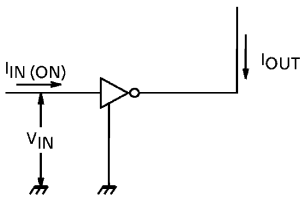
1. I_{CEX}



2. h_{FE}, $V_{CE\ (sat)}$

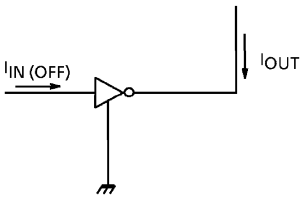


3. $I_{IN\ (ON)}$

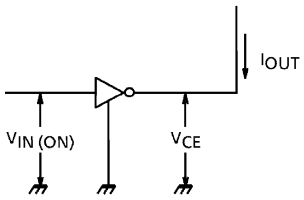


TEST CIRCUIT

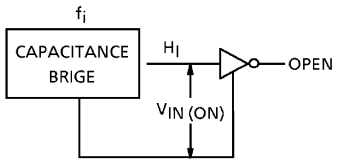
4. $I_{IN\ (OFF)}$



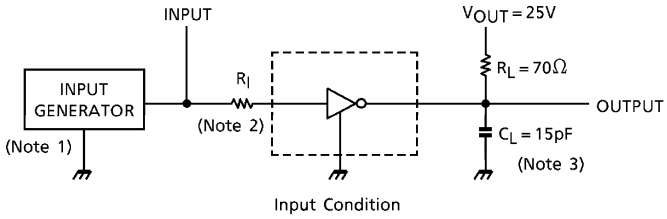
5. $V_{IN\ (ON)}$

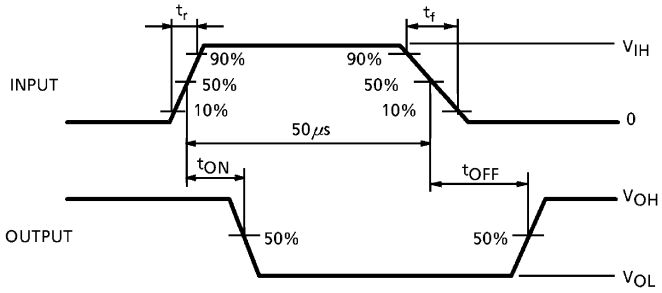


6. C_{IN}



7. t_{ON}, t_{OFF}





(Note 1) Pulse Width 50μs, Duty Cycle 10%
Output Impedance 50Ω, $t_r \leqq 5$ns, $t_f \leqq 10$ns

(Note 2) See right.

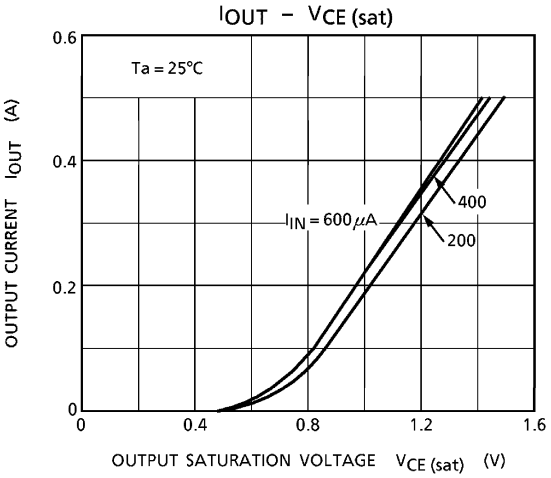
(Note 3) C_L includes probe and jig capacitance.

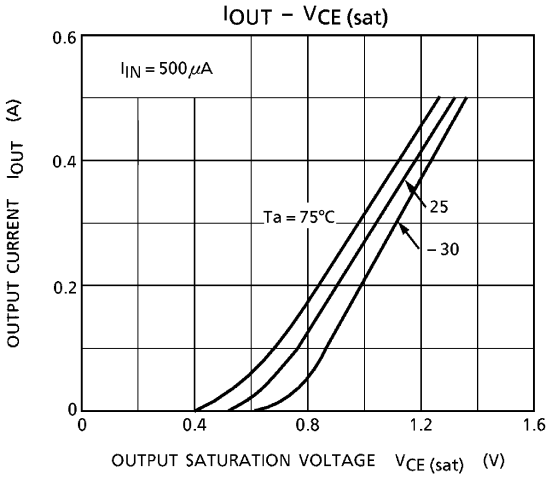
INPUT CONDITION

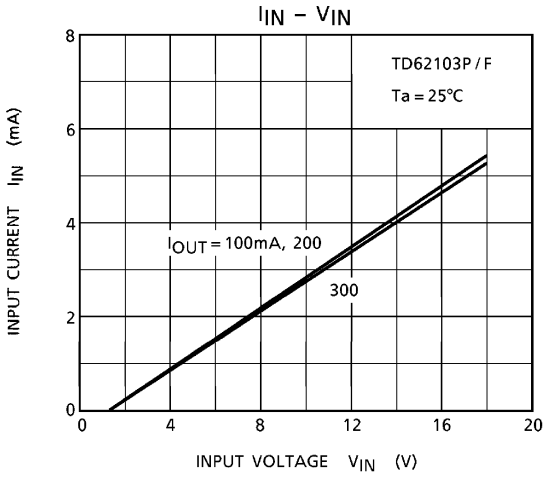
TYPE NUMBER	R_I	V_{IH}
TD62101P / F	2.7kΩ	3V
TD62103P / F	0Ω	3V
TD62104P / F	0Ω	8V
TD62105P / F	0Ω	15V

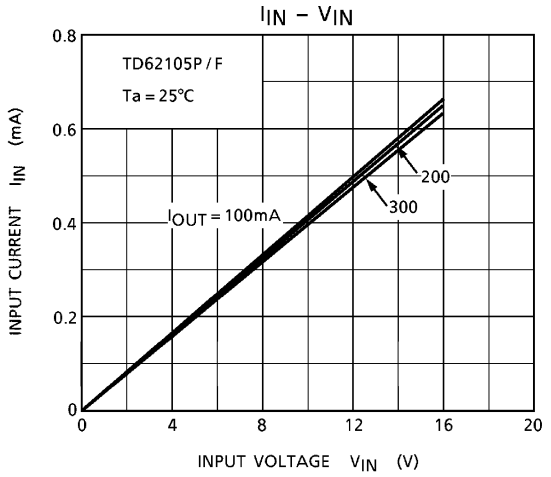
PRECAUTIONS for USING

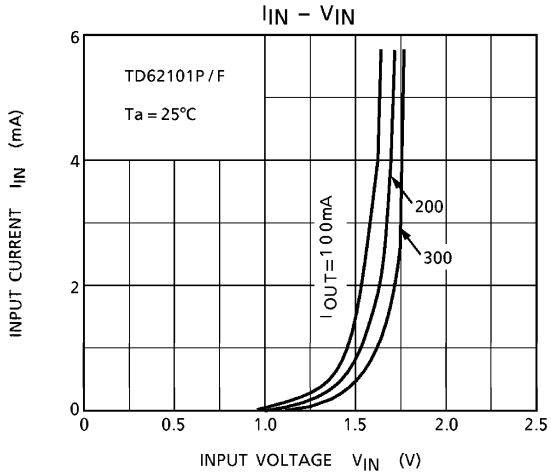
Utmost care is necessary in the design of the output line, GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

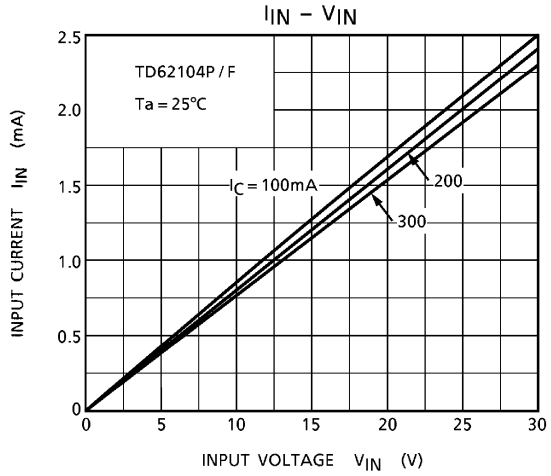

I_{OUT} – $V_{CE\,(sat)}$
Ta = 25°C
I_{IN} = 600 μA
400
200
OUTPUT CURRENT I_{OUT} (A)
OUTPUT SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)


I_{OUT} – $V_{CE\,(sat)}$
I_{IN} = 500 μA
Ta = 75°C
25
– 30
OUTPUT CURRENT I_{OUT} (A)
OUTPUT SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)

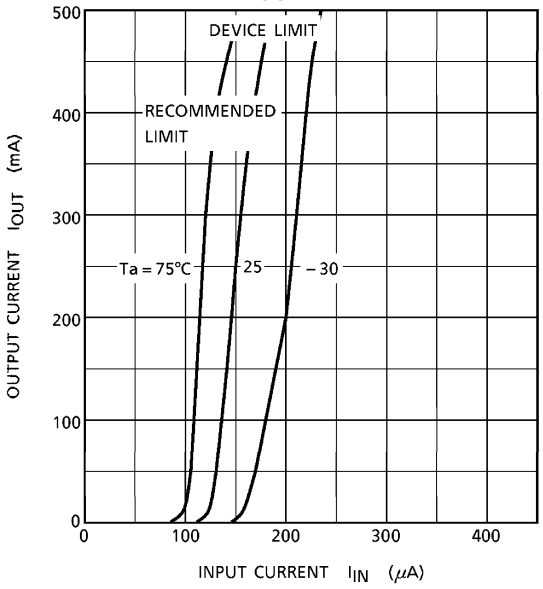

I_{IN} – V_{IN}
TD62103P / F
Ta = 25°C
I_{OUT} = 100mA, 200
300
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)


I_{IN} – V_{IN}
TD62105P / F
Ta = 25°C
I_{OUT} = 100mA
200
300
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)

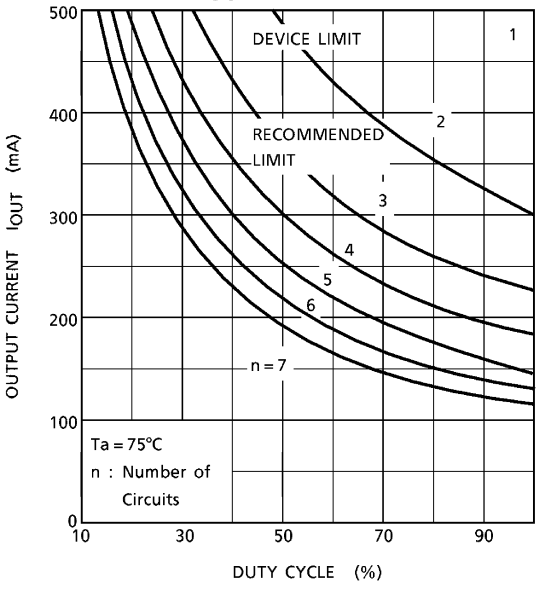

I_{IN} – V_{IN}
TD62101P / F
Ta = 25°C
I_{OUT} = 100mA
200
300
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)


I_{IN} – V_{IN}
TD62104P / F
Ta = 25°C
I_C = 100mA
200
300
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)

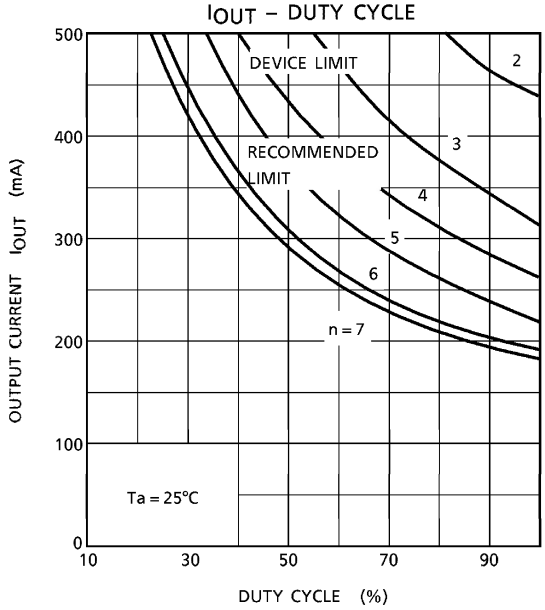
I_{OUT} – I_{IN}



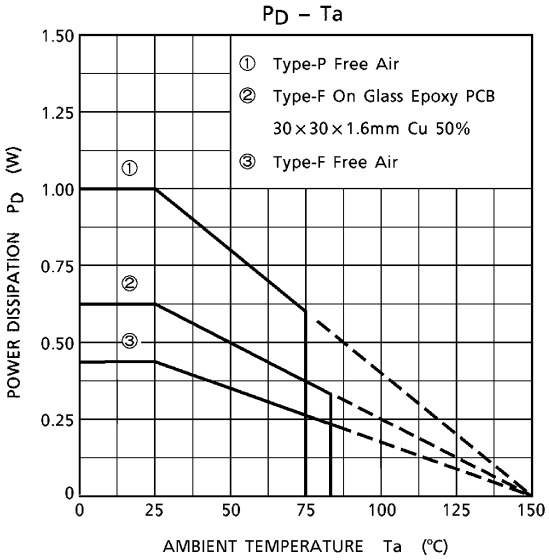
I_{OUT} – DUTY CYCLE



I_{OUT} – DUTY CYCLE



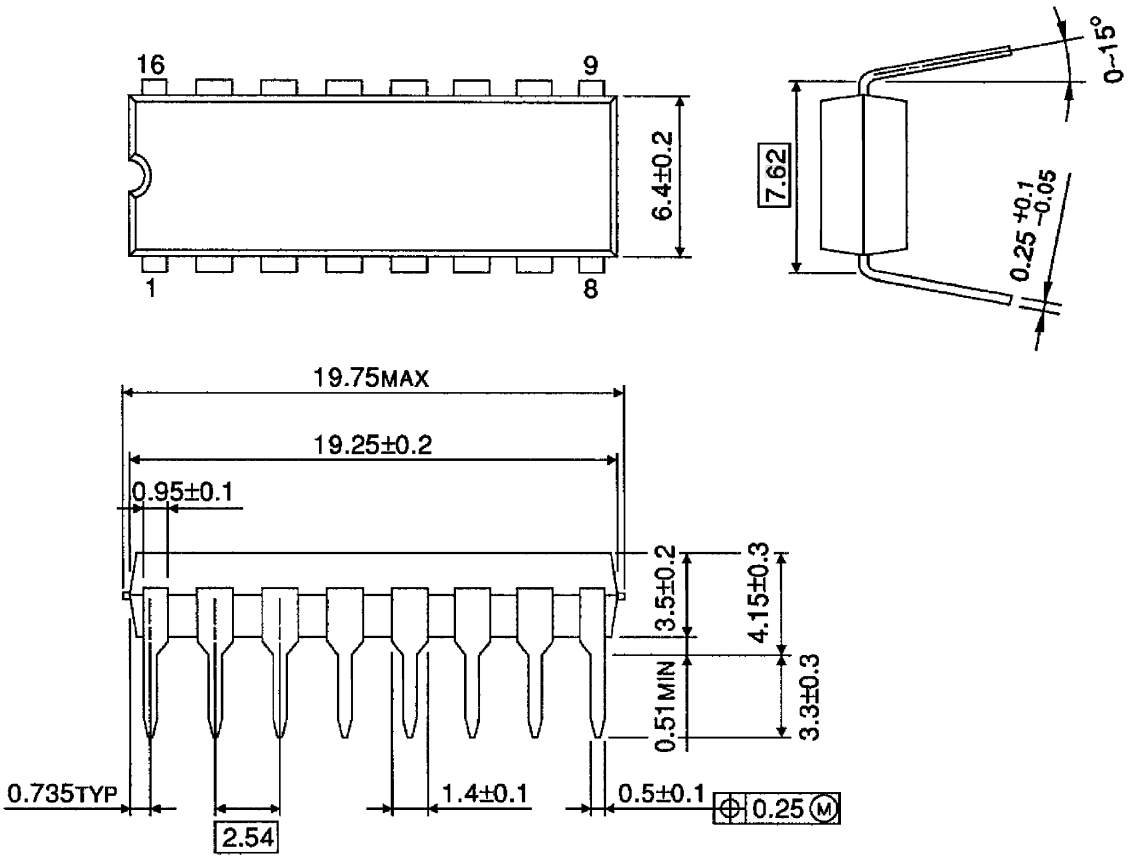
P_D – Ta



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

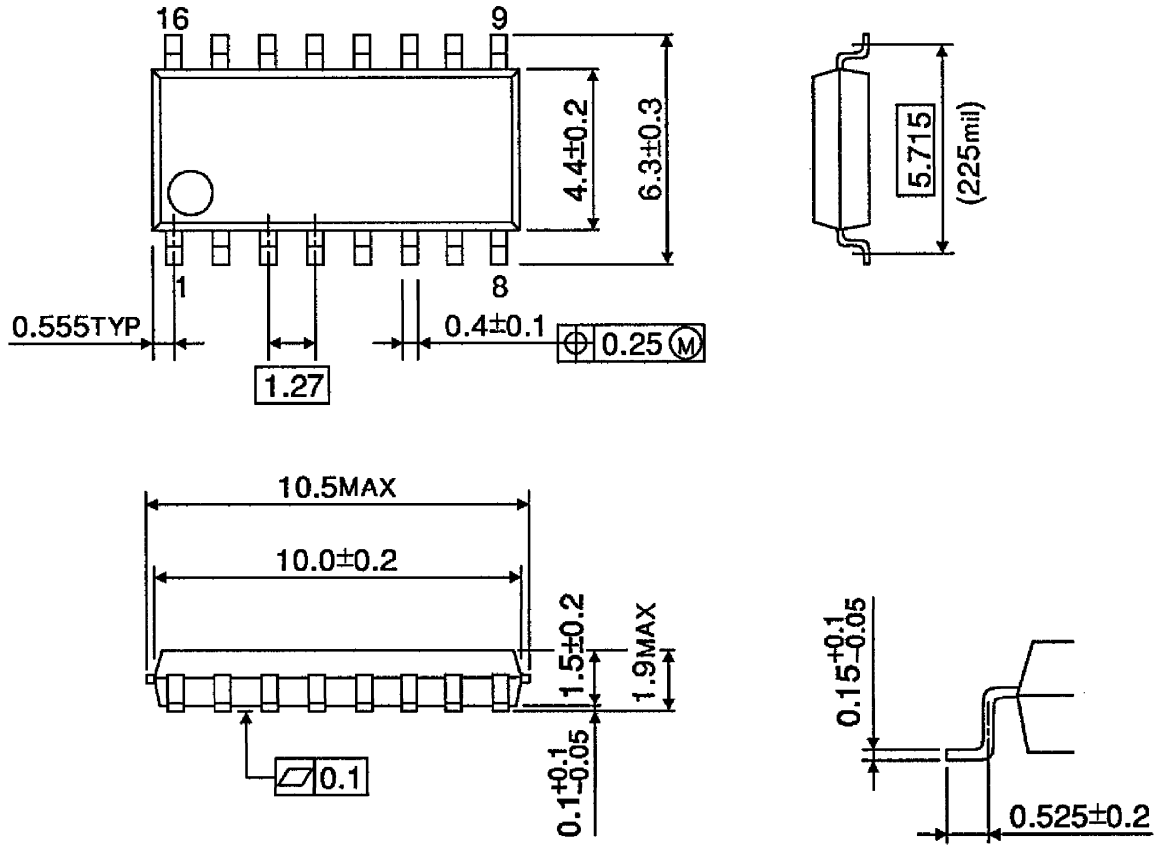


Weight : 1.11g (Typ.)

OUTLINE DRAWING

SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)